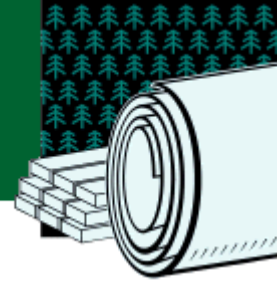


# FOREST PRODUCTS

## Project Fact Sheet



### LINESCAN CAMERA SYSTEM FOR ON-LINE MOISTURE MEASUREMENT

#### BENEFITS

- Improved productivity
- Reduced waste
- Enhanced product quality
- Partnering with a world leader in developing on-line measuring systems for paper webs
- Using expertise of two national laboratories

#### APPLICATIONS

The paper industry will have diagnostic methods for characterizing the moisture in 100 percent of the web product on-line and in real time.

#### Work Continues To Develop On-line Measurements of Paper Web Properties

Industry needs a method for conducting measurements of 100 percent of the web product before it can make significant improvements in its productivity and product quality, and reduce its processing wastes. This project will further the development of technology to measure moisture in the web on-line.

Present monitoring systems use a slow-moving scanning platform with moderate resolution. After a year of experimentation, researchers decided to pursue a dual-band, near-infrared, linescan camera system that would continuously measure the moisture content of the full width of the paper web. The difference in the amount of light transmitted (or reflected) through paper by two bands of infrared energy is used to infer the moisture content of the paper (when one band lies on a water absorption line and the second is close to but away from the water absorption line).



Dual-band near-infrared linescan camera system.

OFFICE OF INDUSTRIAL TECHNOLOGIES

ENERGY EFFICIENCY AND RENEWABLE ENERGY • U.S. DEPARTMENT OF ENERGY

## PROJECT DESCRIPTION

**Goal:** To develop and demonstrate an on-line, real-time technique for monitoring the properties of 100 percent of the paper web using Charge Coupled Device (CCD) camera technology.

The effort for Fiscal Year (FY) 1998 focuses on developing a proof-of-concept prototype of a measuring system, and testing it at Honeywell-Measurex Corporation. By studying two bands of infrared energy, it is possible to distinguish the effect that moisture has on light transmitted/reflected through the paper from the light-scattering effects of the paper itself.

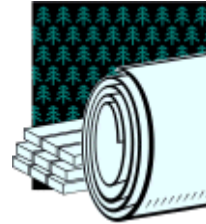
Two additional companies have an interest in serving as the sites for follow-on testing of the prototype. Oak Ridge National Laboratory will be provided with data acquisition capabilities for field studies, and the technology will be made ready for transfer to industry. The latter two activities will continue in FY99.

## PROGRESS & MILESTONES

- Develop a dual-band imaging system for the proof-of-concept prototype.
- Develop a line-light source for on-line operation.
- Develop the software needed for the prototype system.
- Deploy and test the dual-camera system, light system, and computer.
- Support Oak Ridge National Laboratory's field experiments using the system.

## AWARDS, PATENTS, AND INVENTION RECORDS

- The patented LBNL interferometric detector will be used in these experiments.



### PROJECT PARTNERS

Honeywell-Measurex Corporation  
Cupertino, CA

Oak Ridge National Laboratory  
Oak Ridge, TN

Lawrence Livermore National  
Laboratory  
Livermore, CA

### FOR ADDITIONAL INFORMATION PLEASE CONTACT:

Eric Lightner  
Office of Industrial Technologies  
Phone: (202) 586-8130  
Fax: (202) 586-1658  
e-mail: [eric.lightner@ee.doe.gov](mailto:eric.lightner@ee.doe.gov)

Jose E. Hernandez  
Lawrence Livermore Nat'l Lab  
Phone: (925) 423-2160  
Fax: (925) 422-3358  
e-mail: [jeh@llnl.gov](mailto:jeh@llnl.gov)

Please send any comments,  
questions, or suggestions to  
[webmaster.oit@ee.doe.gov](mailto:webmaster.oit@ee.doe.gov)



Office of Industrial Technologies  
Energy Efficiency and Renewable Energy  
U.S. Department of Energy  
Washington, D.C. 20585

August 1998